

SUPPLEMENTARY ONLINE MATERIAL FOR

**A new middle Miocene crocidosoricine shrew from the Mongolian Shargain Gobi Desert**

Vladimir S. Zazhigin and Leonid L. Voyta

Published in *Acta Palaeontologica Polonica* 2018 63 (1): 171-187.

<https://doi.org/10.4202/app.00396.2017>

**Supplementary Online Material**

SOM 1.	Total list of analyzed specimens.....	3
	<b>Fig. 1.</b> Keys for description of analyzed specimens in SOM 1... Figure caption and abbr. ....	3
	I. Type specimens of <i>Shargainosorex angustirostris</i> gen. et sp. nov. (n = 23) from Sharga 2, middle Miocene, Mongolia /holotype, paratypes/ .....	3
	II. Specimens of <i>Shargainosorex angustirostris</i> gen. et sp. nov. (n = 195) from Sharga 2, middle Miocene, Mongolia /left, right fragments of skull; left, right upper isolated teeth; left dentary, semi-mandible fragments; left lower isolated teeth; right dentary, semi-mandible fragments; right lower isolated teeth; other specimens/ .....	4
	III. Specimens of <i>Miosorex grivensis</i> (Depéret, 1892) (n = 6) from La Grive St. Alban, middle Miocene, France .....	9
	IV. Specimens from published sources that images and measurements were used for detailed comparisons and for drawn the Fig. 8 (see main text) / <i>Miosorex grivensis</i> , <i>M. desnoyersianus</i> , <i>M. pusilliformis</i> / .....	10
	V. Specimens of extant shrews (Soricinae, Crocidurinae) from MNHN, ZISP and ZMMU that were used for comparisons / <i>Sorex</i> , <i>Neomys</i> , <i>Crocidura</i> , <i>Myosorex</i> , <i>Paracrocidura</i> , <i>Suncus</i> , <i>Sylvisorex</i> / .....	10
SOM 2.	Measurements of teeth and bones .....	13

	<b>Fig. 1.</b> Measurements performed for morphometric description of material. Figure caption and abbr. ....	13
	<b>Table 1.</b> Measurements of teeth and bone fragments of <i>Shargainosorex angustirostris</i> gen. et sp. nov. and <i>Miosorex pusilliformis</i> (Doben-Florin, 1964) .....	15
	<b>Table 2.</b> Measurements of teeth and bone fragments of <i>Miosorex grivensis</i> (Depéret, 1892). and <i>Miosorex desnoyersianus</i> (Lartet, 1851) .....	17
SOM 3.	Teeth pigmentation .....	18
	<b>Fig. 1.</b> First upper right molars pigmentation of <i>Shargainosorex angustirostris</i> gen. et sp. nov. ... Figure caption and abbr. ....	18
	<b>Fig. 2.</b> Optical photography of the right semi-mandible of <i>Shargainosorex angustirostris</i> gen. et sp. nov. (paratype ZISP#104324/1009), with marked pigmented teeth. ....	18
SOM 4.	Homogeneity of the fossil sample from Sharga 2: normality Shapiro-Wilk test and Coefficient of Variation .....	19
	<b>Table 1.</b> Shapiro-Wilk test (W) for 16 metric features of <i>Shargainosorex angustirostris</i> gen. et sp. nov. from Sharga 2 .....	19
	<b>Table 2.</b> Shapiro-Wilk test (W) for 16 metric features of <i>Crocidura shantungensis</i> Miller, 1901 .....	19
	<b>Table 3.</b> Shapiro-Wilk test (W) for 16 metric features of <i>Sorex minutus</i> Linnaeus, 1766 .....	19
	<b>Table 4.</b> Means and limits of three small-sampled measurements of <i>Shargainosorex angustirostris</i> gen. et sp. nov. (SH) compare to <i>C. shantungensis</i> (CR), <i>S. minutus</i> (SR) .....	20
	<b>Table 5.</b> Coefficient of variation (CV) of 36 measurements of <i>Shargainosorex angustirostris</i> gen. et sp. nov. (SH) compare to <i>C. shantungensis</i> (CR), <i>S. minutus</i> (SR) .....	20
SOM 5	Variability of condylar articulate surface .....	21
	<b>Fig. 1.</b> Shape of condylar surface of <i>Shargainosorex angustirostris</i> gen. et sp. nov. ....	21
	<b>Fig. 2.</b> Shape and variability of condylar surface of several white-toothed shrews .....	21
SOM 6	Rostrum shape reconstruction and skull size .....	22
	<b>Fig. 1.</b> Results of univariate metric comparisons between <i>Shargainosorex angustirostris</i> gen. et sp. nov. (SH), <i>Miosorex pusilliformis</i> (PF), <i>Miosorex grivensis</i> (GR), <i>Crocidura shantungensis</i> Miller, 1901 (CR), and <i>Sorex</i>	22

*minuutus* L., 1766 (SR)

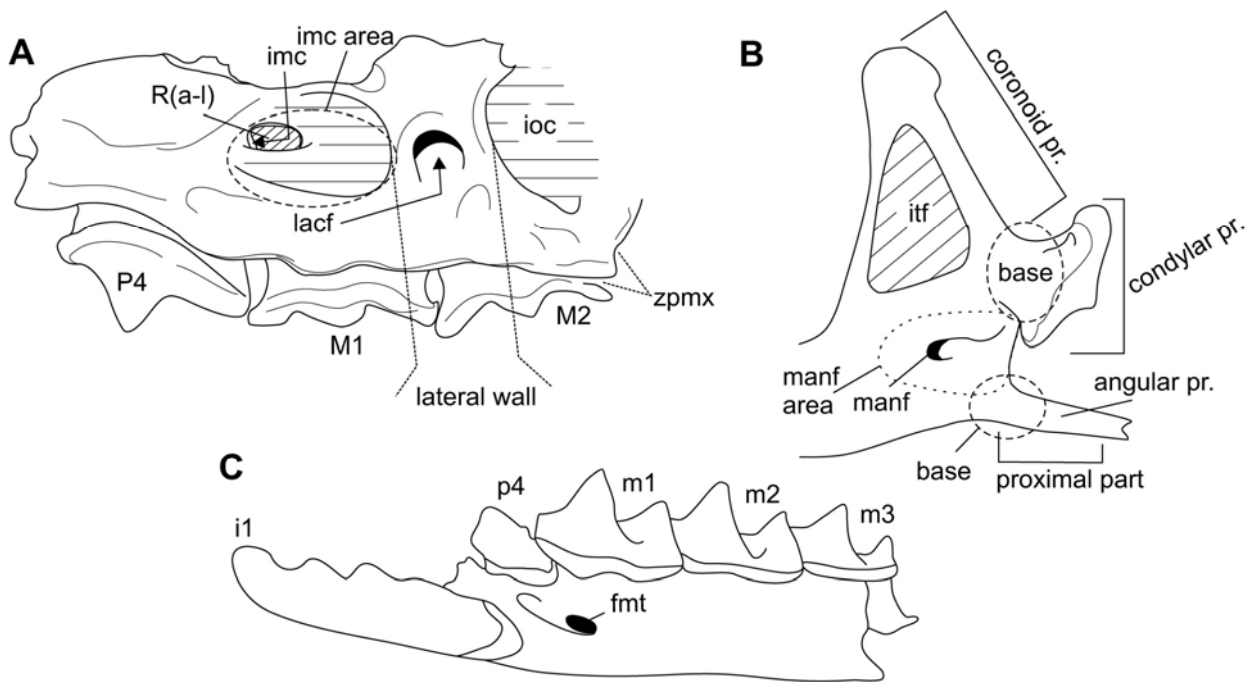
.....

**Fig. 2.** Results of Linear regression analysis (method RMA) of two features (MSL vs P4s/d) for nine soricine species (A) and 18 crocidurinae species (B)... 23

---

SOM 7    Measurements of all studied specimens are available at  
[http://app.pan.pl/SOM/app63-Zazhigin\\_Voyta\\_SOM/SOM7.xls](http://app.pan.pl/SOM/app63-Zazhigin_Voyta_SOM/SOM7.xls)

**SOM 1.** Total list of the analyzed specimens



**Fig. 1.** Keys for description of analyzed specimens in SOM 1. A. Fragment of left maxilla, with P4–M2 in situ, whole lateral wall of ioc with lacf, imc areas retained; B. Fragment of right semi-mandible (dentary not shown) with whole mandibular ramus, partly damaged angular pr. (tip is broken off) retained; C. left dentary fragment, with whole i1, p4–m3 in situ, alveolus a1. Abbreviations: fmt, foramen mentale; imc, incisivo-maxillary canal; ioc, infraorbital canal; itf, internal temporal fossa; lacf, lacrimal foramen; manf, mandibular foramen; R(a-l) antero-lingual root (of M1); zpmx, zygomatic process of maxilla (distal part). Unscaled.

I. Type specimens of *Shargainosorex angustirostris* gen. et sp. nov. (n = 23) from Sharga 2, middle Miocene, Mongolia

**Holotype:** **ZISP#104323** (GIN#959/1010\*) — left dentary fragment, with whole i1, p4–m3 in situ, alveoli of a1.

**Remark:** The numbers in parenthesis from the Personal Zazhigin's Catalog (PZC); the further numbers (without prefix) after slash are same for ZISP Catalog and PZC.

**Paratypes:** **ZISP#104324/1002** (GIN#959/1002) — right dentary fragment, with i1 (tip is broken off), m1 in situ, alveoli of a1, p4; **/1007** — fragment of right semi-mandible, with p4–m3 in situ, damaged mandibular ramus with retained mandibular foramen (manf) area; **/1009** — right dentary fragment, with p4–m3 in situ, alveoli of i1 (with root part of incisor), and a1, small fragment of anterior part of coronoid pr. retained, main cusps of p4 and molars visibly pigmented; **/1045** — fragment of left maxilla, with P4 in situ, alveoli of A4, A5, M1 (postero-lingual), M2 (antero-buccal), whole lateral wall of infraorbital canal (ioc), with lacrimal foramen (lacf), incisivomaxillary canal (imc) areas retained; **/1048** — fragment of right

maxilla, with P4, M1 in situ, alveolus of A5, anterior part of lateral wall of ioc retained; /1049 — fragment of left maxilla, with P4 in situ, alveolus of A5 (partly damaged); /1050 — fragment of left maxilla, with M1, M2 in situ, whole lateral wall of ioc with lacf, imc areas retained; /1055 — fragment of left maxilla, with P4–M3 in situ, whole lateral wall of ioc with lacf, imc areas retained, zygomatic pr. of maxilla retained; /1056 — fragment of right maxilla, with P4 in situ; /1061 — fragment of right maxilla, with P4–M3 in situ, whole lateral wall of ioc with lacf, imc areas retained, zygomatic pr. of maxilla retained; /1065 — fragment of left maxilla, with M2 in situ, alveoli of P4 (antero-buccal, postero-lingual), M1 (antero-buccal), whole lateral wall of ioc with lacf, imc areas retained; /1068 — right I1, main apex and talon apex pigmented; /1069 — fragment of right premaxilla-maxilla, with A3 in situ, alveoli of I1 (partly damaged), A1, A2, A4, A5, P4 (postero-buccal); /1071 — left M2, without antero-, and postero-lingual roots; /1073 — right M1, with antero-buccal root, ; /1080 — right M1, without roots, paracone (pc), protocone (prc) and metacone (mc) are pigmented; /1097 — right a1; /1098 — left dentary fragment, with i1 (proximal part), p4–m3 in situ, alveolus of a1; /1108 — fragment of right semi-mandible, with m3 in situ, whole coronoid pr. and base of condylar pr. retained; /1114 — fragment of left semi-mandible, with m1, m2 in situ, alveoli of m3, whole mandibular ramus with slightly damaged angular pr. (tip is broken off); /1116 — left m3; /1164 — right dentary fragment, with m2 in situ.

II. Specimens of *Shargainosorex angustirostris* gen. et sp. nov. (n = 195) from Sharga 2, middle Miocene, Mongolia

Left fragments of skull (n = 12):

**ZISP#104325/1046** (GIN#959/1046) — fragment of left maxilla, with damaged P4 (buccal half) in situ; /1047 — fragment of left maxilla, with P4 in situ, alveolus of M1 (antero-buccal); /1051 — fragment of left maxilla, with heavily worn M1, M2 in situ, whole lateral wall of ioc, imc area retained; /1053 — fragment of left maxilla, with M2 in situ; /1057 — fragment of left maxilla, with partly damaged P4 (hypoconal flange is broken off) in situ, alveoli of A3 (partly damaged), A4, A5, M1 (antero-, postero-buccal), M2 (antero-buccal), anterior part of lateral wall of ioc retained; /1058 — fragment of left maxilla, with P4 in situ, alveoli of A2–A5, imc area retained; /1063 — fragment of left maxilla, with M1, M2 in situ, alveoli of M3, whole lateral wall of ioc with imc area retained; /1064 — fragment of left maxilla, with M1 in situ, alveoli of P4 (postero-buccal), M2 (postero-lingual damaged), whole lateral wall of ioc with imc area retained; /1066 — fragment of left maxilla, with M1 in situ, alveoli of M2 (antero-, postero-buccal); /1084 — fragment of left maxilla, with M2 in situ, alveolus of M1 (postero-buccal), M3 (antero-buccal); /1085 — fragment of left maxilla, with M1 in situ; /1091 — fragment of left maxilla, with M1 in situ.

Right fragments of skull (n = 10):

**ZISP#104325/1052** (GIN#959/1052) — fragment of right maxilla, with M1 in situ, partly damaged alveoli of M2 (antero-buccal, -lingual); /1059 — fragment of right maxilla, with P4 in situ; /1060 — fragment of right maxilla, with heavily worn P4 in situ; /1062 — fragment of right maxilla, with M1, M2 in situ; /1067 — edentulous fragment of right maxilla, with alveoli of A5, P4, M1 (postero-lingual damaged), anterior part of lateral wall of ioc retained;

**/1070** — edentulous fragment of right premaxilla-maxilla, with alveoli of I1 (partly damaged), A1–A5; **/1076** — fragment of right maxilla, with M1 in situ; **/1077** — fragment of right maxilla, with M1 in situ; **/1081** — fragment of right maxilla, with M2 in situ; **/1082** — fragment of right maxilla, with damaged M2 (without prc and hypoconal flange) in situ.

Left upper isolated teeth (n = 6):

**ZISP#104325/1054** (GIN#959/1054) — left M1, postero-lingual root is broken off; **/1086** — left M2; **/1087** — left M2, without antero-lingual root; **/1088** — left M1, without roots; **/1089** — moderately worn left M2, with postero-buccal root, main cusps pigmented; **/1090** — left M1, without roots.

Right upper isolated teeth (n = 4):

**ZISP#104325/1072** (GIN#959/1072) — right M2, with antero-buccal root; **/1074** — right M2, without postero-buccal, -lingual roots; **/1075** — right M2, with partly damaged roots; **/1078** — right M1, without both posterior roots.

Left dentary fragments (n = 35):

**ZISP#104325/1004** (GIN#959/1004) — left dentary fragment, with p4, m1 in situ, alveolus of i1 (with root part of incisor); **/1014** — left dentary fragment, with moderately worn m1–m3 in situ, small fragment of anterior part coronoid pr. with manf area retained; **/1023** — left dentary fragment, with moderately worn m2, m3 in situ, molar cusps pigmented; **/1027** — left dentary fragment, with m1 in situ, alveoli of a1, p4, molar cusps pigmented; **/1032** — left dentary fragment, with m1, alveoli of m2; **/1036** — left dentary fragment, with m1 in situ, anterior alveolus of m2; **/1037** — left dentary fragment, with m2 (without pcd) and m3 in situ; **/1044** — left dentary fragment, with parts of m1 (posterior root), m2 (talonid) and m3 (pcd with anterior root) in situ, alveoli of m2 (anterior) and m3 (posterior); **/1101** — left dentary fragment, with p4, m1 and trigonid of m2 in situ, alveolus of a1; **/1102** — left dentary fragment, with p4–m2 in situ; **/1103** — left dentary fragment, with p4–m1 in situ, alveoli of i1 (with part of root), a1, m2 (anterior); **/1119** — left dentary fragment, with m1, m2 (talonid) in situ, alveoli a1 (partly damaged), p4, m2 (anterior), m3; **/1124** — left dentary fragment, with m1 (talonid), m2, m3 (talonid) in situ, alveolus of m3 (anterior); **/1129** — left dentary fragment, with m2, m3 in situ; **/1135** — left dentary fragment, with m2, m3 in situ; **/1136** — left dentary fragment, with m1–m3 in situ, partly damaged alveoli of i1, a1, p4, molar cusps pigmented; **/1138** — left dentary fragment, with m1 (talonid), m2, m3 in situ, alveoli of p4, molar cusps pigmented; **/1139** — left dentary fragment, with m1 in situ, alveoli of m2, m3; **/1140** — left dentary fragment, with m1, m2 in situ; **/1142** — left dentary fragment, with m1–m3 in situ, alveoli of i1 (buccal part), a1, p4, molar cusps pigmented; **/1144** — left dentary fragment, with m1 (talonid), m2 in situ, alveoli m3; **/1146** — left dentary fragment, with m1–m3 in situ; **/1147** — left dentary fragment, with m1, m2 in situ, molar cusps pigmented; **/1148** — left dentary fragment, with m1 in situ, alveoli of p4 (damaged), m2 (anterior); **/1151** — left dentary fragment, with m2, m3 (cleaved) in situ; **/1152** — left dentary fragment, with m3 in situ, alveoli of m2; **/1155** — left dentary fragment is slightly rounded by abrasion, with m1 (talonid), m2, m3 in situ; **/1160** — left dentary fragment, with m2 in situ, alveoli of p4, m1, m3 (anterior); **/1170** — left dentary fragment, with m3 in situ, alveoli of m1 (posterior), m2; **/1171** — left dentary fragment, with m2 in situ, alveoli of m1, m3; **/1172** — left dentary

fragment, with m2, m3 in situ, alveoli of m1 (posterior); **/1173** — left dentary fragment, with m1 in situ; **/1178** — left dentary fragment, with m2 in situ, alveoli of m1 (posterior), m3 (anterior); **/1213** — edentulous left dentary fragment, alveoli of m2–m3; **/1214** — edentulous left dentary fragment, alveoli of m2 (posterior), m3.

Left semi-mandible fragments (n = 38):

**ZISP#104325/1011** (GIN#959/1011) — fragment of left semi-mandible, with p4, m1 in situ, alveoli of a1, m2, m3, small fragment of anterior part of coronoid pr. retained, with corner of internal temporal fossa (itf) and manf area; **/1012** — fragment of left semi-mandible, with m1, m2 in situ, mandibular ramus with base of coronoid pr. and damaged condylar pr. (upper facet is broken off), manf area retained; **/1025** — fragment of left semi-mandible, with m2 in situ, alveoli of m3, small fragment of anterior part of coronoid pr. and base of condylar pr. retained; **/1040** — edentulous fragment of left semi-mandible, with posterior alveolus of m3, mandibular ramus with whole coronoid and condylar prs., proximal part of angular pr. retained; **/1042** — edentulous fragment of left semi-mandible, with alveoli of m2, m3, small part of coronoid pr. with base if itf retained; **/1093** — fragment of left semi-mandible, with m1–m2 in situ, alveoli of a1, p4, whole mandibular ramus with proximal part of angular pr., molar cusps pigmented; **/1096** — fragment of left semi-mandible, with p4–m3 in situ, alveolus of a1, whole mandibular ramus with proximal part of angular pr.; **/1109** — fragment of left semi-mandible, with m2, m3 (talonid) in situ, coronoid and condylar prs. (upper facet is slightly damaged) retained, molar cusps pigmented; **/1110** — fragment of left semi-mandible, with m1, m3 in situ, alveoli of i1, a1, p4, m2 (with part of posterior root), manf area and proximal part of angular pr. retained; **/1111** — fragment of left semi-mandible, with m2, m3 in situ, alveolus of m1 (posterior), small part of coronoid pr. with lower part of itf, condylar pr. (upper facet is broken off) and manf area retained; **/1112** — fragment of left semi-mandible, with m1, m2 in situ, alveoli of a1, p4, m3, small part of coronoid pr. with lower part of itf, manf area and proximal part of angular pr. are retained; **/1115** — fragment of left semi-mandible, with m1, m2 in situ, alveoli of a1 (partly damaged, with small part of root), p4, m3, whole coronoid pr., manf area and base of angular pr. are retained; **/1117** — fragment of left semi-mandible, with m1 (talonid), m2, m3 in situ, small part of coronoid pr. retained; **/1120** — fragment of left semi-mandible, with m1–m3 in situ, partly damaged alveoli of p4, small part of coronoid pr. retained; **/1123** — fragment of left semi-mandible, with m2 (without pcd) in situ, alveoli of m3, small part of coronoid pr. with lower part of itf, manf area, and base of angular pr. are retained; **/1134** — fragment of left semi-mandible, with m2, m3 in situ, small part of coronoid pr. with lower part of itf, manf area and base of angular pr. are retained, molar cusps pigmented; **/1162** — fragment of left semi-mandible, with m1–m3 in situ, damaged alveoli of p4, mand area and base of angular pr. are retained; **/1175** — fragment of left semi-mandible, with m1 in situ, alveoli of m2, m3, small part of coronoid pr. with lower part of itf retained; **/1177** — fragment of left semi-mandible, with moderately worn m2 in situ, alveoli of m1 (posterior), m3, small part of coronoid pr. with lower part of itf retained; **/1182** — fragment of left semi-mandible, with damaged m3 (talonid) in situ, anterior alveolus of m3, whole mandibular ramus with base of angular pr.; **/1184** — edentulous fragment of left semi-mandible, alveoli of m2 (posterior), m3, whole mandibular ramus with base of angular pr.; **/1185** — edentulous fragment of left semi-mandible, alveoli of m2 (posterior), m3 with damaged lingual walls, whole mandibular ramus with base of angular pr.; **/1187** — edentulous fragment of left semi-mandible, whole mandibular ramus with narrow

part of base of angular pr.; /1189 — edentulous fragment of left semi-mandible, whole mandibular ramus with narrow part of base of angular pr.; /1191 — edentulous fragment of left semi-mandible, posterior alveolus of m3, small part of coronoid pr. with lower part of itf, condylar pr. (upper facet is broken off), and base of angular pr. are retained; /1192 — edentulous fragment of left semi-mandible, posterior alveolus of m3, whole mandibular ramus with proximal part of angular pr.; /1194 — edentulous fragment of left semi-mandible, whole mandibular ramus with proximal part of angular pr.; /1196 — edentulous fragment of left semi-mandible, whole mandibular ramus with proximal part of angular pr.; /1199 — edentulous fragment of left semi-mandible, whole mandibular ramus with proximal part of angular pr.; /1203 — edentulous fragment of left semi-mandible, alveoli of m1–m3, condylar pr. (upper facet is broken off) retained; /1204 — edentulous fragment of left semi-mandible, whole coronoid and condylar prs.; /1205 — edentulous fragment of left semi-mandible, small part of coronoid pr. with lower part of itf, condylar pr. are retained; /1206 — edentulous fragment of left semi-mandible, small part of coronoid pr., condylar pr. (upper facet is broken off) and base of angular pr. are retained; /1208 — edentulous fragment of left semi-mandible, with whole coronoid pr., and slightly damaged condylar pr. (medial part of lower facet is broken off); /1209 — edentulous fragment of left semi-mandible, alveoli of m3, small part of coronoid pr. with lower part of itf, damaged condylar pr. are retained; /1210 — edentulous fragment of left semi-mandible, alveoli of m1 (posterior), m2, m3, small part of coronoid pr. with lower part of itf, manf area are retained; /1212 — edentulous fragment of left semi-mandible, alveoli of m1–m3; /1218 — edentulous fragment of left semi-mandible, alveoli of m2 (posterior), m3, small part of coronoid pr. with lower part of itf, manf area and base of angular pr. are retained.

Left lower isolated teeth (n = 7):

**ZISP#104325/1028** (GIN#959/1028) — left m2, anterior root is broken off; /1033 — left m2; /1035 — left m2 (?) fragment, without pcd and anterior root; /1113 — left m3, without anterior root; /1153 — left m1 (?) fragment, buccal part; /1154 — left m1 fragment, without pcd and anterior root; /1220 — left m3.

Right dentary fragments (n = 50):

**ZISP#104325/1001** (GIN#959/1001) — right dentary fragment, with i1 (tip is broken off), n1 in situ, alveoli of a1, p4; /1003 — right dentary fragment is slightly rounded by abrasion, with p4, m1 in situ, alveolus of a1; /1005 — right dentary fragment with p4–m2 in situ in situ, alveolus of a1; /1006 — right dentary fragment with p4, m1 and trigonid of m2 in situ, alveolus of a1; /1013 — right dentary fragment, with m1–m3 in situ (m1 partly damaged), small fragment of anterior part coronoid pr. retained, molar cusps pigmented; /1015 — right dentary fragment, with m1–m3 in situ (m2 partly damaged), small fragment of anterior part coronoid pr. retained; /1016 — right dentary fragment, with m1, m2 in situ, alveoli of m3; /1017 — right dentary fragment, with moderately worn m1 and m2 in situ, alveoli of a1, p4; /1018 — right dentary fragment, with moderately worn m1 and m2 in situ, alveoli of p4, m3; /1019 — right dentary fragment, with m1, m2 and talonid of m3 in situ, alveolus of anterior root of m3; /1021 — right dentary fragment, with m1, alveoli of p4, m2; /1024 — right dentary fragment, with m2 in situ, alveoli of m3; /1026 — right dentary fragment, with moderately worn m2, m3 in situ; /1029 — right dentary fragment, with m2 in situ, alveoli of



m3; **/1030** — right dentary fragment, with m1, m2 in situ; **/1031** — right dentary fragment, with m1 in situ, alveoli of m2, m3 (anterior); **/1034** — right dentary fragment, with m2 in situ, alveoli of m3; **/1038** — right dentary fragment, with m3 in situ; **/1043** — right dentary fragment, with talonid of m3 in situ, alveoli of m1 (posterior), m2, m3 (anterior); **/1099** — right dentary fragment, with p4, m1 in situ; **/1100** — right dentary fragment, with p4–m2 and trigonid of m3 in situ, alveoli of i1 (with part of root), a1, m3 (posterior); **/1105** — right dentary fragment, with moderately worn i1 (tip is broken off), p4, m1 in situ, alveoli of a1, m2 (anterior); **/1106** — right dentary fragment, with p4, m1 in situ; **/1107** — right dentary fragment, with i1 (proximal part of crown), p4, m1 in situ, alveolus of a1; **/1121** — right dentary fragment, with m1, m2 in situ, alveoli of p4, m3, small part of coronoid pr. retained, molar cusps pigmented; **/1122** — right edentulous dentary fragment, with alveoli of m1 (posterior), m2, m3 (anterior); **/1126** — right dentary fragment, with m1, m2 in situ, damaged alveoli of p4; **/1127** — right dentary fragment, with m2 in situ, alveoli of m1, m3; **/1128** — right dentary fragment, with heavily worn m1, m2 (talonid) in situ, alveoli of a1 and p4 (partly damaged), m2 (with part of anterior root); **/1130** — right dentary fragment, with m1 in situ, alveoli of a1 (partly damaged), p4, m2 (anterior), molar cusps pigmented; **/1131** — right dentary fragment, with m2 in situ, alveoli of m3; **/1132** — right dentary fragment, with m1, m2 in situ, alveolus of m3 (anterior); **/1133** — right dentary fragment, with m1, m2 in situ, alveoli of m3; **/1137** — right dentary fragment, with m1, m2 in situ, alveoli of p4, m3 (anterior), molar cusps pigmented; **/1141** — right dentary fragment, with m2 in situ, alveoli of m3; **/1143** — right dentary fragment, with m1 (damaged pcd), m2 in situ; **/1149** — right dentary fragment, with m2 in situ, damaged anterior alveolus of m3; **/1150** — right dentary fragment, with m2 in situ, alveoli of m1, m3; **/1156** — right dentary fragment, with m1, m2 in situ; **/1157** — right dentary fragment, with m1 in situ, alveoli of p4, m2 (anterior), molar cusps pigmented; **/1158** — right dentary fragment, with m1 in situ, alveoli of a1, p4, molar cusps pigmented; **/1161** — right dentary fragment, with m2, m3 (talonid) in situ, alveoli of m1 (posterior); **/1163** — right dentary fragment, with m1 (trigonid), m2 (talonid) in situ, alveoli of p4, m1 (posterior), m2 (anterior); **/1165** — right dentary fragment, with m1, m2 in situ, alveoli of m3; **/1167** — right dentary fragment, with m1 in situ, alveoli of p4; **/1168** — right dentary fragment, with m3 in situ, alveoli of m2 (posterior); **/1176** — right dentary fragment, with m1 (without pcd and anterior root), m2 in situ, anterior alveolus of m1; **/1179** — right dentary fragment, with m1 in situ, alveoli of p4; **/1215** — right dentary fragment, with talonid of m2 in situ, alveoli of m2 (anterior), m3; **/1216** — right dentary fragment, with base of i1 in situ, alveoli of a1, p4.

Right semi-mandible fragments (n = 27):

**ZISP#104325/1008** (GIN#959/1008) — fragment of right semi-mandible, with moderately worn p4–m2 in situ, alveoli of a1 and m3, mandibular ramus with coronoid and condylar prs., angular pr. damaged; **/1020** — fragment of right semi-mandible, with m1, m2 in situ, alveoli of m3, damaged mandibular ramus with retained manf area, cusps of molar pigmented; **/1022** — fragment of right semi-mandible, with m2 in situ, alveoli of m1, m3, mandibular ramus with narrow fragment of anterior part of the coronoid pr. and base of condylar pr., part of itf and manf area retained, molar cusps pigmented; **/1039** — fragment of right semi-mandible, with m (talonid) in situ, anterior alveolus of m3, mandibular ramus with whole coronoid and condylar prs., proximal part of angular pr. retained; **/1041** — edentulous fragment of right semi-mandible, with posterior alveolus of m3, small part of coronoid pr. and base of condylar

pr. retained; /1092 — fragment of right semi-mandible, with m1–m3 in situ, small part of coronoid pr., whole condylar pr., proximal part of angular pr. retained; /1094 — fragment of right semi-mandible, with m1 in situ, alveoli of m2, m3, whole of mandibular ramus with base of angular pr.; /1095 — fragment of right semi-mandible, with p4–m3 in situ, damaged alveolus of a1, whole mandibular ramus with proximal part of angular pr.; /1118 — fragment of right semi-mandible, with m2, m3 in situ, small part of coronoid pr. retained; /1125 — fragment of right semi-mandible, with heavily worn m2 in situ, alveoli of m1, m3, partly damaged mandibular ramus with manf area and base of angular pr. are retained; /1145 — fragment of right semi-mandible, with m3 in situ, damaged posterior alveolus of m2, small part of coronoid pr. with lower part of itf, condylar pr. (upper facet is partly damaged), manf area, and base of angular pr. are retained; /1166 — fragment of right semi-mandible, with m2, m3 in situ, mand area and base of angular pr. are retained; /1181 — edentulous fragment of right semi-mandible, whole mandibular ramus with proximal part of angular pr.; /1183 — edentulous fragment of right semi-mandible, whole mandibular ramus with proximal part of angular pr.; /1186 — edentulous fragment of right semi-mandible, coronoid and condylar prs. retained; /1188 — edentulous fragment of right semi-mandible, whole mandibular ramus with base of angular pr.; /1190 — edentulous fragment of right semi-mandible, whole mandibular ramus with narrow part of base of angular pr.; /1193 — fragment of right semi-mandible, with damaged m3 (without pcd and anterior root), anterior alveolus of m3, whole mandibular ramus with base of angular pr.; /1195 — edentulous fragment of right semi-mandible, small part of coronoid and condylar prs. retained; /1197 — edentulous fragment of right semi-mandible, whole mandibular ramus with base of angular pr.; /1198 — edentulous fragment of right semi-mandible, whole mandibular ramus with proximal part of angular pr.; /1200 — edentulous fragment of right semi-mandible, whole coronoid pr., bases of condylar and angular prs. are retained; /1201 — edentulous fragment of right semi-mandible, whole coronoid pr. with medial part of condylar pr. and base of angular pr. are retained; /1202 — edentulous fragment of right semi-mandible, small posterior part of coronoid pr. with lower part of itf, condylar pr. (upper facet is slightly damaged) are retained; /1207 — edentulous fragment of right semi-mandible, posterior alveolus of m3, whole mandibular ramus with base of angular pr.; /1211 — edentulous fragment of right semi-mandible, alveoli of p4–m3, small part of coronoid pr. with lower part of itf, manf area are retained; /1217 — edentulous fragment of right semi-mandible, alveoli of m2 (posterior), m3, main part of coronoid pr. with manf area retained.

Right lower isolated teeth (n = 4):

**ZISP#104325/1104** (GIN#959/1104) — right m2, without roots; /1159 — right m2; /1174 — right m1; /1180 — right m2.

Other specimens (n = 2):

**ZISP#104325/1083** (GIN#959/1083) — edentulous dentary fragment, with two damaged alveoli; /1219 — left coronoid pr. fragment.

III. Specimens of *Miosorex grivensis* (Depéret, 1892) (n = 6) from La Grive St. Alban, middle Miocene, France

**ZISP#103200/1** — left dentary fragment, with p4–m2 in situ, alveoli of m3; **/2** — fragment of left semi-mandible, with m2 in situ, alveoli of m3, whole mandibular ramus with base of angular pr.; **/4** — fragment of right maxilla, with P4, M1 in situ, alveoli of A4, A5, anterior part of ioc retained; **/5** — fragment of right maxilla, M1, M2 in situ, whole lateral wall of ioc, imc area and distal part of zygomatic process of maxilla are retained; **/6** — left I1; **/7** — left i1 (broken in half).

**Remark:** These are specimens from middle Miocene deposits of La Grive Saint Alban (not mentioned any layers), which Prof. Pierre Mein given for Prof. Igor M. Gromov (or/and Alexey A. Gureev) from paleontological collections "Mein" of the University Lyon 1. Specimens housed in Zoological Institute of RAS (St. Petersburg, Russia).

IV. Specimens from published sources that images and measurements were used for detailed comparisons and for drawn the Fig. 8 (see main text)

Doben-Florin (1964: 36, Table 21, teeth measurements): *Miosorex pusilliformis* (Doben-Florin, 1964) — **BSP#11587–589, 11592, 11595, 11598, 11599, 11604, 11613–615, 11618** (n = 12); (1964: 39, Table 26, mandibular measurements) **BSP#10488, 11575, 11577, 11587, 11590, 11592, 11605, 11618, 19109–111, 19115, 19116, 19120** (n = 14); from Wintershof-West, early Miocene, Germany.

Doben-Florin (1964: 88–91, Plates III, IV, photo): *Miosorex pusilliformis* — **BSP#10469, 11569, 11599, 11607, 19126** (n = 5), *ibid.*

Doben-Florin (1964: 40, Table 28, measurements): *Miosorex grivensis* (Depéret, 1892) — **HLMD#8, 9** (n = 2), from La Grive St. Alban, middle Miocene, France.

Ziegler (1989: 28, Table 3, measurements): *Miosorex pusilliformis* — **BSP#1974\_XIV/1048–1066, /1097** (n = 20), from Erkertshofen 2, early Miocene, Germany; **BSP#1976\_XXII/2962–78, 2980–83, 2986–90, 2992–94, 2997–99, 3739–75** (n = 61), and **SMNS#44715** (n = 15), from Petersbuch 2, early Miocene, Germany; **BSP#1982\_XXXII/244–327** (n = 94), **SMNS#44716, 44718** (n = 111), **SMNS#44717** (n = 44), **Stub.#11A-D** (n = 17), from Stubersheim 3, early Miocene, Germany.

Ziegler (1989: 67, Plate III, photo): *Miosorex pusilliformis* — **SMNS#44716-B3,O3,O4** (n = 3), from Stubersheim 3, early Miocene, Germany.

Ziegler (1989: 32, measurements): *Miosorex desnoyersianus* (Lartet, 1851) — **BSP#1976\_XXII/2984, /2985, /2991, /2995, /2996** (n = 5), and **SMNS#44714** (n = 1; only M2), from Petersbuch 2, early Miocene, Germany.

Engesser (2009: 20, measurements of the neotype): *Miosorex desnoyersianus* — **MNHN#Sa1201** (n = 1), from Sansan, middle Miocene, France.

Engesser (2009: 21, Fig. 11c,d,e, draws): *Miosorex desnoyersianus*— **FSL#66225, 66226** (n = 2), *ibid.*

V. Specimens of extant shrews (Soricinae, Crocidurinae) from MNHN, ZISP and ZMMU that were used for comparisons

Soricinae (2 genera, 9 species, n = 72):

*Sorex asper* Thomas, 1914 — **ZISP#88159** (n = 1), from Kyrgyzstan, 35 km from Naryn Town.

*Sorex caecutiens* Laxmann, 1785 — **ZISP#93693, 93695, 93699, 93700, 96170** (n = 5), from Russia, Magadanskaya Oblast', Kolyma River.

*Sorex daphaenodon* Thomas, 1907 — **ZISP#93536** (n = 1), from Russia, Chukotka, Penzhina River, Sheiboveem Stream; **ZISP#93546** (n = 1); from Russia, Chukotka, Voegi Village.

*Sorex gracillimus* Thomas, 1907 — **ZISP#90049–052, 90055–056, 90058–061** (n = 10), from Russia, Sachalin Island; **ZISP#86848, 86856, 86862–864, 86866–867** (n = 7), from Russia, Shikhotan Island.

*Sorex minutissimus* Zimmermann, 1780 — **ZISP#89599, 89602, 89604–605, 89608** (n = 5), from Russia, Primor'e, Suputinskii Natural Reserve.

*Sorex minutus* Linnaeus, 1766 — **ZISP#84518–519, 84522, 84524, 84528–533, 84540, 84543, 84545, 84556, 84562** (females, n = 15), **ZISP#84520, 84523, 84525, 84534–537, 84541, 84544, 84546, 84548, 84550, 84554–555, 84561** (males, n = 15), from Russia, Novgorodskaya oblast', Oskui Village vicinity.

*Sorex mirabilis* Ognev, 1937 — **ZISP#83907** (n = 1), from Russia, Primor'e, Suputinskii Natural Reserve.

*Sorex roboratus* Hollister, 1913 — **ZISP#90201–209, 90212** (n = 10), from Amurskaya Oblast', Tunguska River.

*Neomys fodiens* (Pennant, 1771) — **ZISP#11883** (n = 1), from Russia, Moscow, Izmailovskii Menagerie.

Crocidurinae (5 genera, 18 species, n = 48):

*Crocidura afeworkbekelei* Lavrenchenko, Voyta et Hutterer, 2016 — **ZMMU#S-162697** (holotype; n = 1), from Ethiopia, Konteh Area of the Sanetti Plateau (Bale Mountains National Park). Remark: Published in Lavrenchenko, L.A., Voyta, L.L. and Hutterer, R. 2016. Diversity of shrews in Ethiopia, with the description of two new species of *Crocidura* (Mammalia: Lipotyphla: Soricidae). *Zootaxa* 4196: 038–060.

- Crocidura flavescens* (I. Geoffroy, 1827) — **MNHN#C.G.1983-81** (n = 1), from South Africa, Port St. Johns.
- Crocidura hildegardae* Thomas, 1904 — **MNHN#C.G.1983-84** (n = 1), from Tanzania, Oldeani Mountain (Ngorongoro Conservation Area).
- Crocidura hirta* Peters, 1852 — **MNHN#C.G.1983-85** (n = 1), from Tanzania (Tanganyika), Mikridari (Mikmdari).
- Crocidura juvenetae* Heim de Balsac, 1958 — **MNHN#C.G.2012-1087** (n = 1), from Sierra Leone, Gbié. Remark: Voucher specimen, published in Jacquet, F., Hutterer, R., Nicolas, V., Decher, J., Colyn, M., Couloux, A. and Denys, C. 2013. New status for two african giant shrews, *Crocidura goliath goliath* and *C. goliath nimbasilvanus* (Mammalia: Soricomorpha), based on molecular and geometric morphometric analyses. *African Zoology* 48:13–29.
- Crocidura lamottei* Heim de Balsac, 1968 — **MNHN#C.G.1981-1191** (n = 1), from Côte d'Ivoire, Foro Savannah.
- Crocidura leucodon* (Hermann, 1780) — **ZISP#72918** (n = 1), from Georgia, Sahaburo Village vicinity.
- Crocidura macmillani* Dollman, 1915 — **ZMMU#S-166029** (n = 1), from Ethiopia, Middle Godjeb Valley. Remark: Published in Lavrenchenko et al. 2016 (see above *C. afeworkbekelei*).
- Crocidura muricauda* Miller, 1900 — **MNHN#C.G.2012-1108** (n = 1), from Sierra Leone, Gbié. Remark: Voucher specimen, published in Jacquet et al. 2013 (see above *C. juvenetae*).
- Crocidura obscurior* Heim de Balsac, 1958 — **MNHN#C.G.2012-1116** (n = 1), from Guinea, Nimba Mt. Remark: Specimen, published in Jacquet, F., Nicolas, V., Colyn, M., Kadjo, B., Hutterer, R., Decher, J., Akpatou, B., Cruaud, C. and Denys C. 2013. Forest refugia and riverine barriers promote diversification in the West African pygmy shrew (*Crocidura obscurior* complex, Soricomorpha). *Zoologica Scripta* 1–18 doi:10.1111/zsc.12039.
- Crocidura serezhkyensis* Laptev, 1929 — **ZISP#77431** (n = 1), from Tadjikistan, Sarez Lake.
- Crocidura shantungensis* Miller, 1901 — **ZISP#89423, 89425, 89427–430, 89433, 89435, 89445, 89447–450, 89452–453** (females, n = 15), **ZISP#89467, 89469–470, 89472, 89475, 89477–478, 89481–482, 89485–486, 89489–492** (males, n = 15), from Russia, Primor'e, Hasan Lake vicinity.
- Crocidura yaldeni* Lavrenchenko, Voyta et Hutterer, 2016 — **ZMMU#S-165343** (holotype; n = 1), from Ethiopia, Beletta Forest. Remark: Published in Lavrenchenko et al. 2016 (see above *C. afeworkbekelei*).
- Myosorex cafer* Sundevall, 1846 — **MNHN#C.G.1982-313** (n = 1), from South Africa, Port St. Johns (~250 m a.s.l.).

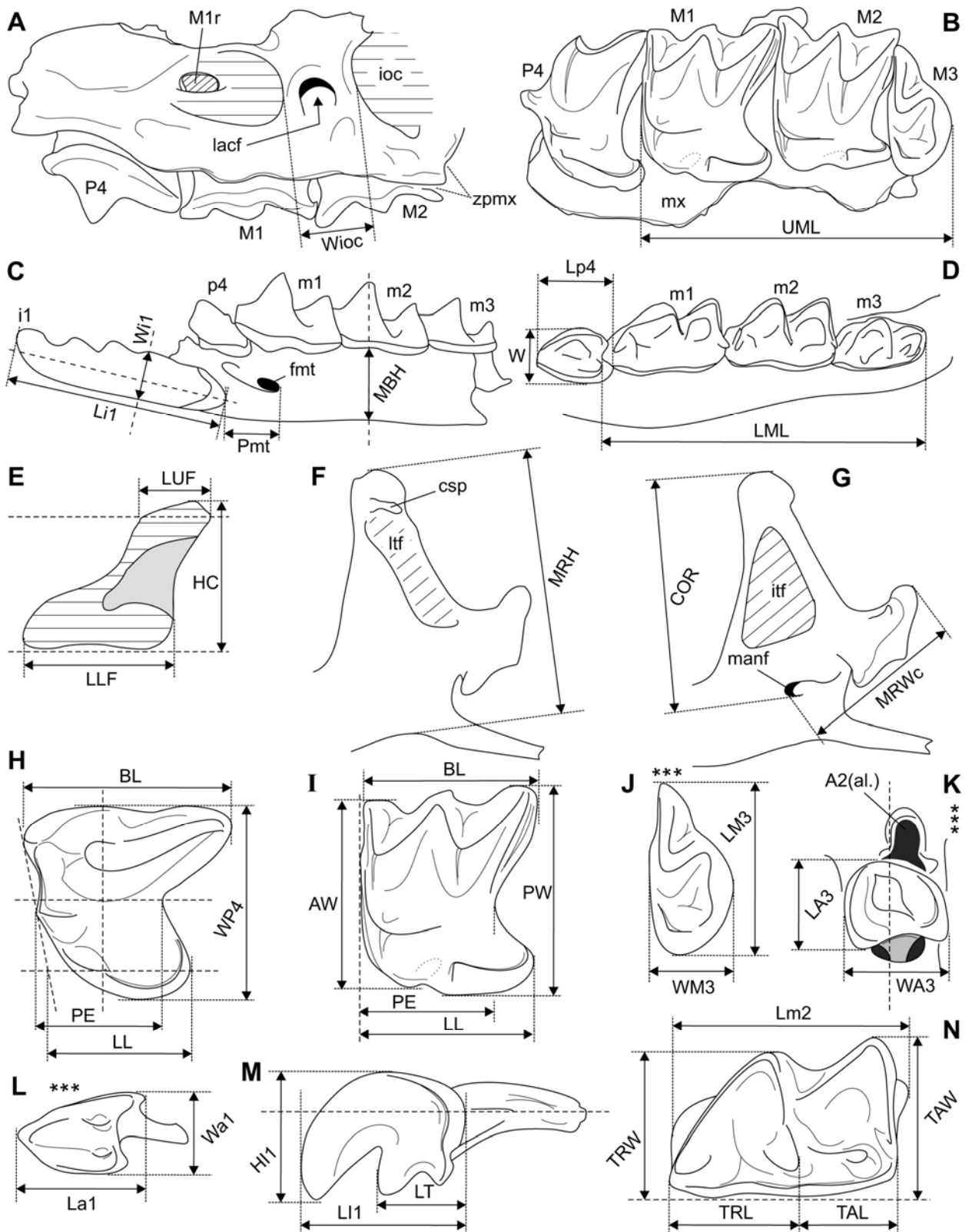
*Paracrociodura schoutedeni* Heim de Balsac, 1956 — **MNHN#C.G.1967-1439, C.G.1981-1199**  
(n = 2), from Gabon, Belinga.

*Suncus etruscus* (Savi, 1822) — **ZISP#102775** (n = 1), from Vietnam, Tanh Linh Vill. (Ba Vi National Park).

*Sylvisorex johnstoni* (Dobson, 1887) — **MNHN#C.G.1991-96** (n = 1), from Congo, Brazza.

*Sylvisorex megalura* Jentink, 1888 — **MNHN#C.G.1992-386** (n = 1), from Guinea, Nimba Mt.

**SOM 2. Measurements of teeth and bones**



**Fig. 1.** Measurements performed for morphometric description of material. These were taken for: left maxilla fragment in lateral view (A), the left maxilla fragment in occlusal view (B), the left dentary fragment in lateral view (C), the left dentary fragment in occlusal view (D), the right condylar process articular surfaces (E), the mandibular ramus in lateral view (F), the

mandibular ramus in medial view (G), the left P4 (H), the left M1 (I), the left M3 (J), the left A3 (K), the right a1 (L), the right I1 in buccal mirror view (M), the right m2 in occlusal view (N). All bones and teeth (diagrammatic images) belonged to the *Shargainosorex angustirostris* gen. et sp. nov. from Sharga 2, middle Miocene, Mongolia. Triple asterisks marked buccal side of tooth. Abbreviations: A2(al.) = A2 alveolus; csp = coronoid spicule; fmt = foramen mentale; ioc = infraorbital canal; itf = internal temporal fossa; lacf = lacrimal foramen; ltf = lateral (external) temporal fossa; manf = mandibular foramen; mx = maxilla; zpmx = zygomatic process of maxilla. Measurement abbreviations see in the main text ("Material..."). Unscaled.



**Table 1.** Measurements of teeth and bone fragments of *Shargainosorex angustirostris* gen. et sp. nov. and *Miosorex pusilliformis* (Doben-Florin, 1964). Measurements in millimeters are presented as the mean, standart error of mean, range, standard deviation, and number of specimens in parentheses. Material for *M. pusilliformis* was published earlier (see above SOM 1: VI). Abbreviations see in main text.

Measurements	<i>S. angustirostris</i>	<i>M. pusilliformis</i>	Measurements	<i>S. angustirostris</i>	<i>M. pusilliformis</i>
COR	2.92±0.03/2.70–3.30/ 0.13 (19)		W(m3)	0.56±0.004/0.51–0.61/ 0.02 (36)	0.64±0.03/0.55–1.06/ 0.13 (12)
MBH	0.93±0.017/0.80–1.08/ 0.07 (18)		Wioc	0.73±0.01/0.68–0.80/ 0.04 (6)	
MRH	3.41±0.02/3.20–3.56/ 0.10 (19)		UML	2.78–3.02 (2)	
MRWc	2.21±0.02/1.98–2.33/ 0.08 (15)		L(I1)	1.57 (1)	
Pmt	0.77±0.03/0.66–0.88/ 0.08 (7)		LT	0.91 (1)	
HC	1.06±0.01/0.86–1.23/ 0.07 (27)		H(I1)	1.04 (1)	
LLF	1.05±0.01/0.92–1.18/ 0.06 (30)		L(A3)	0.29 (1)	
LUF	0.55±0.01/0.37–0.66/ 0.06 (27)		W(A3)	0.46 (1)	
LML	3.40±0.01/3.26–3.54/ 0.07 (16)	*3.16±0.02/3.07–3.30/ 0.07 (12)	BL(P4)	1.26±0.01/1.18–1.34/ 0.05 (8)	
L(i1)	2.69 (1)		W(P4)	1.17±0.01/1.13–1.24/ 0.04 (7)	
W(i1)	0.66±0.007/0.64–0.67/ 0.01 (4)		LL(P4)	0.86±0.21/0.79–0.95/ 0.06 (8)	
L(a1)	0.78 (1)		PE(P4)	0.79±0.02/0.69–0.91/ 0.06 (8)	
W(a1)	5.51 (1)		BL(M1)	1.27±0.01/1.15–1.4/ 0.06 (8)	

				0.06 (18)	
L(p4)	0.82±0.02/0.70–0.99/ 0.08 (11)		AW(M1)	1.30±0.01/1.09–1.42/ 0.08 (18)	
W(p4)	0.57±0.008/0.52–0.64/ 0.03 (14)		PW(M1)	1.38±0.02/1.16–1.51/ 0.08 (18)	
L(m1)	1.29±0.007/1.19–1.48/ 0.05 (60)	1.34±0.01/1.25–1.45/ 0.05 (12)	LL(M1)	1.22±0.01/1.14–1.31/ 0.05 (18)	
TRL(m1)	0.78±0.006/0.67–0.90/ 0.04 (60)		PE(M1)	0.95±0.01/0.86–1.06/ 0.05 (18)	
TAL(m1)	0.46±0.005/0.36–0.59/ 0.04 (60)		BL(M2)	1.18±0.01/1.06–1.30/ 0.06 (17)	
TRW(m1)	0.69±0.005/0.58–0.78/ 0.04 (59)		AW(M2)	1.34±0.01/1.25–1.50/ 0.07 (17)	
TAW(m1)	0.76±0.004/0.69–0.84/ 0.03 (59)	0.77±0.01/0.70–0.82/ 0.03 (12)	PW(M2)	1.30±0.02/1.12–1.46/ 0.08 (17)	
L(m2)	1.23±0.006/1.12–1.37/ 0.05 (69)	1.35±0.01/1.25–1.45/ 0.05 (12)	LL(M2)	1.17±0.01/1.09–1.27/ 0.06 (17)	
TRL(m2)	0.70±0.004/0.60–0.79/ 0.03 (69)		PE(M2)	0.93±0.01/0.93–1.00/ 0.04 (17)	
TAL(m2)	0.46±0.004/0.36–0.58/ 0.03 (69)		L(M3)	1.14 (2)	
TRW(m2)	0.69±0.004/0.61–0.80/ 0.03 (65)		W(M3)	0.58–0.63 (2)	
TAW(m2)	0.73±0.003/0.66–0.80/ 0.03 (65)	0.78±0.01/0.70–0.85/ 0.04 (12)	PE(M1)–index	0.30±0.01/0.22–0.40/ 0.04 (18)	
L(m3)	1.01±0.008/0.90–1.14/ 0.04 (35)	1.03±0.01/0.97–1.10/ 0.04 (12)	PE(M2)–index	0.27±0.01/0.19–0.33/ 0.04 (17)	

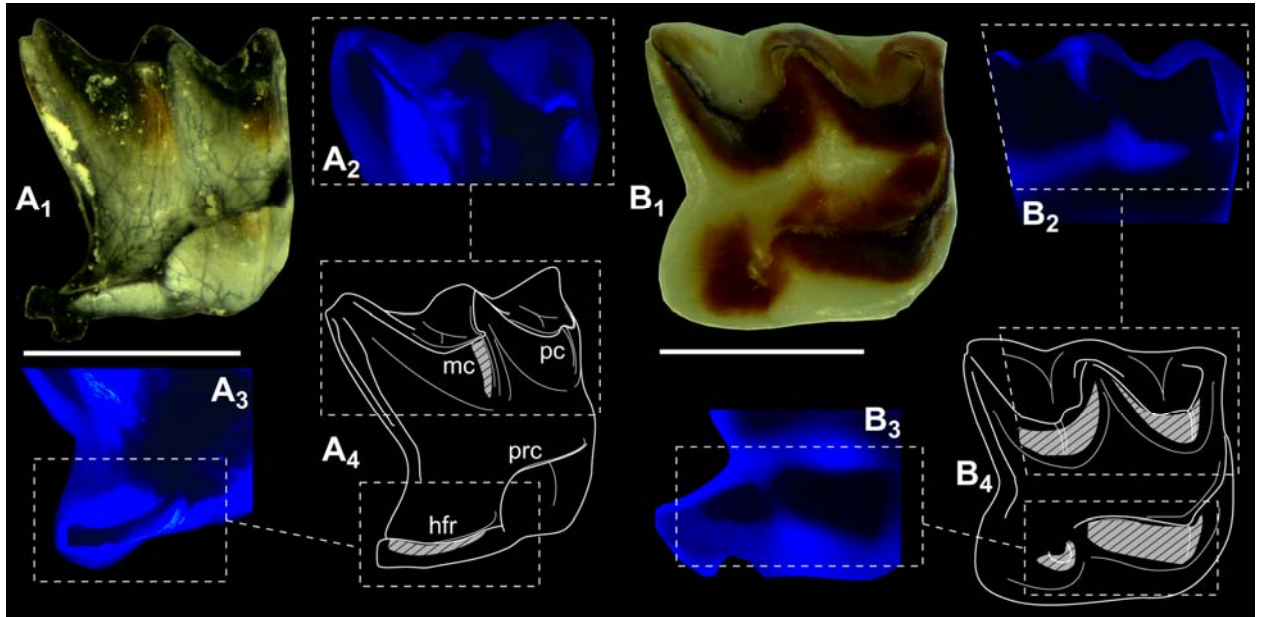
Notes: \* — Measurements of *Miosorex pusilliformis* from Doben-Florin (1964) should be used with caution because sum of the teeth lengths not corresponded to LML. Probably teeth measuring were performed via microscope, but LML with using of caliper. Accordance to this for analyses we preferred to use tooth measurements.

**Table 2.** Measurements of teeth and bone fragments of *Miosorex grivensis* (Depéret, 1892), and *Miosorex desnoyersianus* (Lartet, 1851). Content of cells seen above in Table 1. Materials for *M. grivensis* (marked as A), and *M. desnoyersianus* were published earlier (see above SOM 1: VI); for *M. grivensis* (marked as B) used unpublished material from ZISP Collections (see above SOM 1: III).

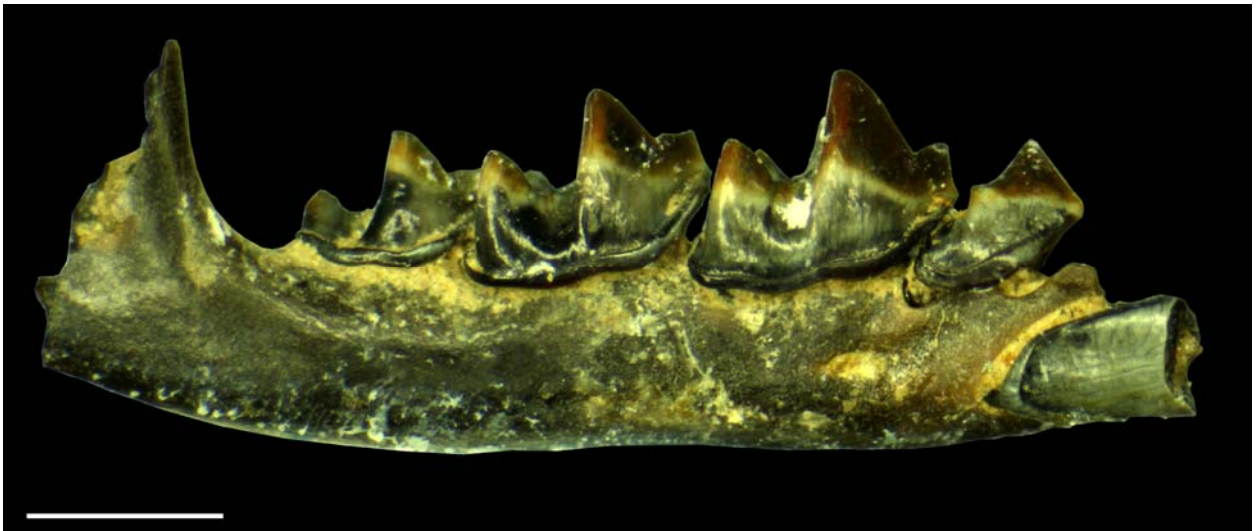
Measurements	<i>M. grivensis</i> <sup>A</sup>	<i>M. grivensis</i> <sup>B</sup>	<i>M. desnoyersianus</i>	Measurements	<i>M. grivensis</i> <sup>A</sup>	<i>M. grivensis</i> <sup>B</sup>	<i>M. desnoyersianus</i>
COR5		3.41 (1)		W(m3)	0.7 (2)		
MRH		4.14 (1)		Wioc		0.63 (1)	
MRWc		2.23 (1)		L(II)		1.44 (1)	
HC		1.19 (1)		LT		0.66 (1)	
LLF		1.18 (1)		H(II)		1.08 (1)	
LUF		0.65 (1)		BL(P4)		1.57 (1)	
L(i1)		2.73 (1)		W(P4)		1.27(1)	
W(i1)		0.64 (1)		LL(P4)		1.09 (1)	
L(p4)		1.12 (1)	0.70 (1)	PE(P4)		0.94 (1)	
W(p4)		0.66 (1)	0.59 (1)	BL(M1)		1.47–1.52 (2)	1.18, 1.19, 1.22 (3)
LML	3.62–3.63 (2)			AW(M1)		1.32–1.49 (2)	
L(m1)	1.50–1.52 (2)	1.50 (1)	1.23–1.26 (2)	PW(M1)		1.57–1.80 (2)	1.17, 1.21, 1.28 (3)
TRL(m1)		0.83 (1)		LL(M1)		1.36–1.37 (2)	
TAL(m1)		0.60 (1)		PE(M1)		1.14–1.17 (2)	
TRW(m1)		0.87 (1)		BL(M2)		1.37 (1)	
TAW(m1)	0.86–0.90 (2)	0.99 (1)	0.73–0.76 (2)	AW(M2)		1.62 (1)	
L(m2)	1.50 (2)	1.41–1.45 (2)	1.15, 1.24, 1.28 (3)	PW(M2)		1.50 (1)	
TRL(m2)		0.77–0.79 (2)		LL(M2)		1.18 (1)	
TAL(m2)		0.54–0.59 (2)		PE(M2)		1.09 (1)	
TRW(m2)		0.86–0.88 (2)		PEM1-index		0.24 (2)	
TAW(m2)	0.85 (2)	0.86–0.91 (2)	0.69–0.82 (3)	PEM2-index		0.17 (1)	
L(m3)	1.20–1.70 (2)						

Note: *M. grivensis*<sup>A</sup> — see Doben-Florin (1964: 40, Table 28); *M. desnoyersianus* — see Ziegler (1989: 32).

### SOM 3. Teeth pigmentation



**Fig. 1.** First upper right molars pigmentation of *Shargainosorex angustirostris* gen. et sp. nov. (A), and greatly pigmented *Sorex daphaenodon* Thomas, 1907 (B). Optical photography of the right M1 of new taxa (paratype ZISP#104324/1080), with pigmented of main cusps in occlusal view (**A<sub>1</sub>**). Optical photography of the right M1 of Siberian large-toothed shrew (ZISP#93536) in occlusal view (**B<sub>1</sub>**). **A<sub>2</sub>**, **B<sub>2</sub>**. ultraviolet (UV-A, 365–395 nm) images of the buccal part of teeth. **A<sub>3</sub>**, **B<sub>3</sub>**. ultraviolet image of the postero-lingual part of teeth. **A<sub>4</sub>**, **B<sub>4</sub>**. explanatory drawings. Scale bars = 1 mm. Abbreviations: hfr = hypoconal flange ridge; mc = metacone; pc = paracone; prc = protocone.



**Fig. 2.** Optical photography of the right semi-mandible of *Shargainosorex angustirostris* gen. et sp. nov. (paratype ZISP#104324/1009), with marked pigmented teeth. Scale bar = 1 mm.

**SOM 4.** Homogeneity of the fossil sample from Sharga 2: normality Shapiro–Wilk test and Coefficient of Variation

**Table 1.** Shapiro–Wilk test (W) for 16 metric features of *Shargainosorex angustirostris* gen. et sp. nov. from Sharga 2

Measurements	W/n	Measurements	W/n
COR	0.947/19	LML	0.991/16
MBH	0.941/18	L(m1)	0.968/60
MRH	0.947/19	L(m2)	0.973/69
MRWc	*0.846/15	L(m3)	0.974/35
Pmt	0.920/7	Wioc	0.845/6
HC	0.935/27	BL(P4)	0.868/8
LLF	*0.876/30	BL(M1)	0.960/18
LUF	0.928/27	BL(M2)	0.961/17

Note: \* (grey filling) — significant value of test (sample is not uniform); abbreviations see in "Material ...".

**Table 2.** Shapiro–Wilk test (W) for 16 metric features of *Crocidura shantungensis* Miller, 1901

Measurements	W(n = 30)	Measurements	W(n = 30)
COR	0.964	LML	0.940
MBH	*0.906	L(m1)	0.956
MRH	0.964	L(m2)	0.934
MRWc	0.964	L(m3)	0.969
Pmt	0.951	Wioc	*0.901
HC	0.973	BL(P4)	0.982
LLF	*0.923	BL(M1)	*0.909
LUF	0.935	BL(M2)	0.974

Notes see in Table 1.

**Table 3.** Shapiro–Wilk test (W) for 16 metric features of *Sorex minutus* Linnaeus, 1766

Measurements	W/n	Measurements	W/n
COR	0.930/29	LML	0.958/30
MBH	*0.887/30	L(m1)	0.940/30
MRH	0.939/29	L(m2)	0.936/30
MRWc	0.961/29	L(m3)	0.946/30
Pmt	0.960/30	Wioc	0.986/30
HC	0.959/30	BL(P4)	0.935/30
LLF	0.943/30	BL(M1)	0.939/30
LUF	0.983/30	BL(M2)	0.965/30

Notes see in Table 1.

**Table 4.** Means and limits of three small-sampled measurements of *Shargainosorex angustirostris* gen. et sp. nov. (SH) compare to *C. shantungensis* (CR), *S. minutus* (SR). Measurements in millimeters are presented as the mean, standard error of mean, standard deviation and range; for comparisons with recent samples in square brackets presented the difference between the limits (bolded); number of specimens are presented in parentheses

Measurements	SH	CR (n = 30)	SR (n = 30)
Pmt	0.77±0.03/0.08/ 0.66–0.88[ <b>0.22</b> ](7)	0.77±0.01/0.10/ 0.6–1.1[ <b>0.5</b> ]	0.62±0.01/0.08/ 0.45–0.78[ <b>0.33</b> ]
Wioc	0.73±0.01/0.04/ 0.68–0.8[ <b>0.12</b> ](6)	0.63±0.02/0.12/ 0.46–0.95[ <b>0.49</b> ]	1.15±0.01/0.08/ 0.97–1.37[ <b>0.40</b> ]
BL(P4)	1.26±0.01/0.05/ 1.18–1.34[ <b>0.16</b> ](8)	1.64±0.009/0.05/ 1.52–1.74[ <b>0.22</b> ]	1.17±0.006/0.03/ 1.08–1.24[ <b>0.16</b> ]

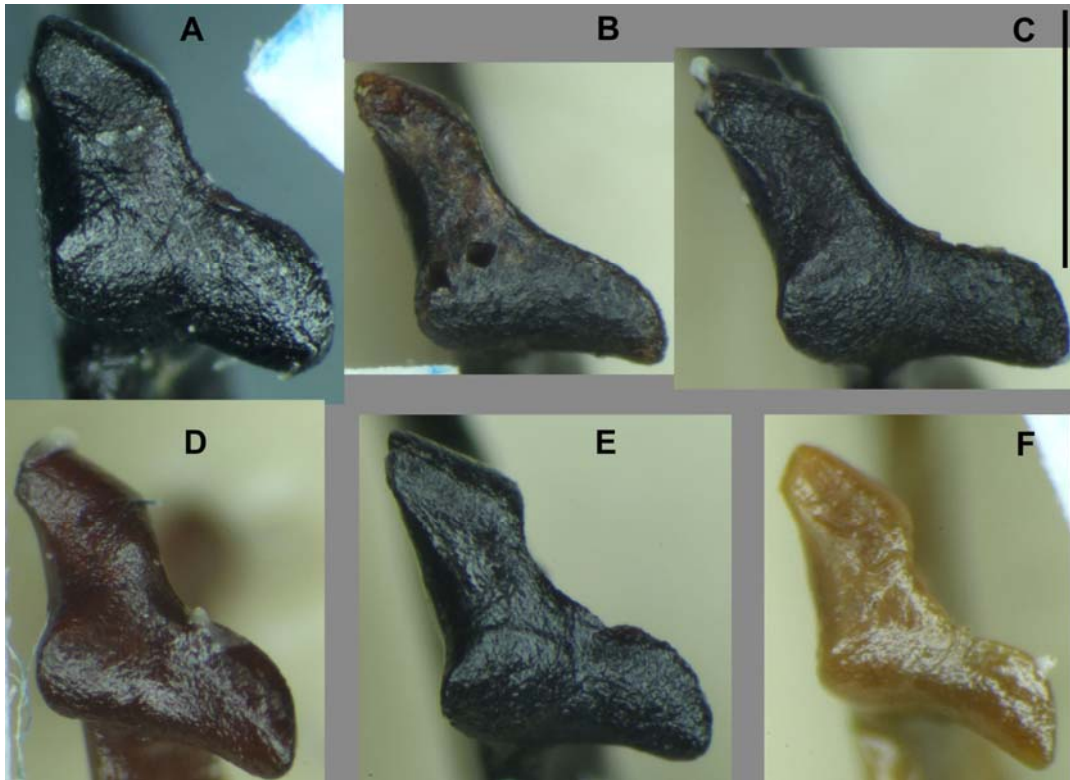
Note: abbreviations see in "Material ...".

**Table 5.** Coefficient of variation (CV) of 36 measurements of *Shargainosorex angustirostris* gen. et sp. nov. (SH) compare to *C. shantungensis* (CR), *S. minutus* (SR). CV values in percents; number of specimens are presented in parentheses

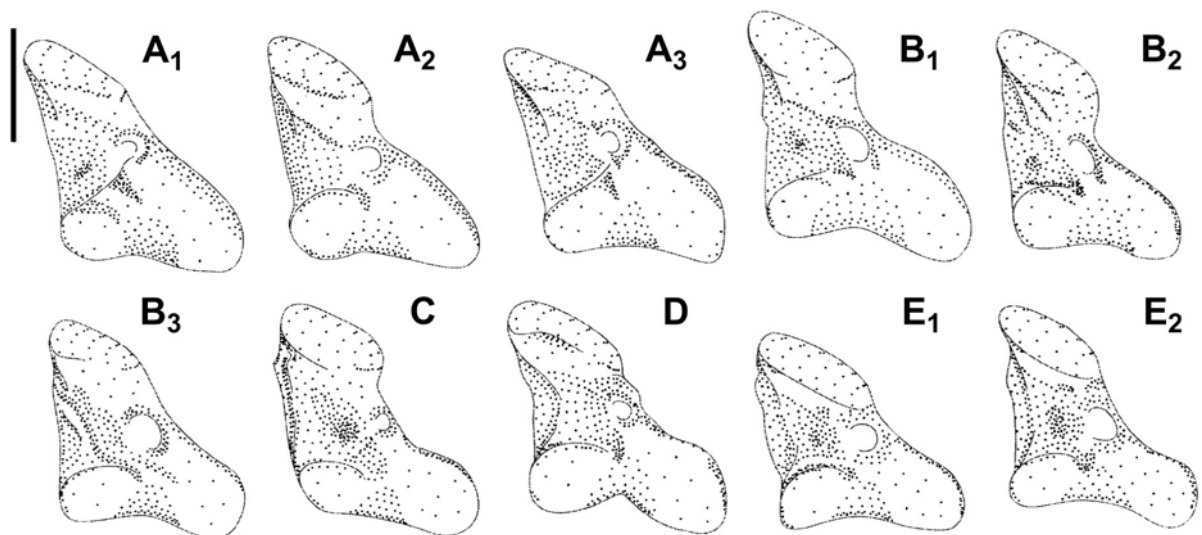
Measure	SH	CR	SR	Measure	SH	CR	SR
COR	4.6 (19)	4.9 (30)	4.9 (29)	TAW(m2)	4.3 (65)	4.0 (30)	4.2 (30)
MBH	7.8 (18)	10.6 (30)	13.1 (30)	L(m3)	4.8 (35)	4.4 (30)	3.8 (30)
MRH	3.0 (19)	5.2 (30)	3.2 (29)	W(m3)	4.7 (36)	4.3 (30)	3.3 (30)
MRWc	3.8 (15)	4.8 (30)	6.6 (29)	Wioc	6.1 (6)	19.6 (30)	7.6 (30)
Pmt	10.7 (7)	14.0 (30)	14.4 (30)	BL(P4)	4.1 (8)	3.3 (30)	2.8 (30)
HC	7.4 (27)	7.9 (30)	4.6 (30)	W(P4)	4.1 (7)	3.3 (30)	5.4 (30)
LLF	6.4 (30)	8.1 (30)	5.9 (30)	LL(P4)	7.0 (8)	7.3 (30)	7.3 (30)
LUF	11.0 (27)	14.3 (30)	6.3 (30)	PE(P4)	8.6 (8)	5.1 (30)	5.6 (30)
LML	2.3 (16)	2.9 (30)	2.9 (30)	BL(M1)	5.1 (18)	4.1 (30)	3.0 (30)
L(m1)	4.2 (60)	4.1 (30)	4.2 (30)	AW(M1)	6.5 (18)	4.6 (30)	3.3 (30)
TRL(m1)	6.0 (60)	4.2 (30)	5.2 (30)	PW(M1)	6.3 (18)	5.7 (30)	3.3 (30)
TAL(m1)	9.7 (60)	6.0 (30)	7.6 (30)	LL(M1)	4.5 (18)	3.3 (30)	2.7 (30)
TRW(m1)	6.1 (59)	3.2 (30)	4.4 (30)	PE(M1)	5.3 (18)	4.4 (30)	3.1 (30)
TAW(m1)	4.9 (59)	4.5 (30)	3.8 (30)	BL(M2)	5.2 (17)	4.6 (30)	3.0 (30)
L(m2)	4.6 (69)	3.3 (30)	3.9 (30)	AW(M2)	5.4 (17)	5.1 (30)	3.7 (30)
TRL(m2)	5.0 (69)	5.4 (30)	5.6 (30)	PW(M2)	6.7 (17)	5.3 (30)	4.7 (30)
TAL(m2)	8.0 (69)	6.5 (30)	5.4 (30)	LL(M2)	5.2 (17)	4.1 (30)	2.8 (30)
TRW(m2)	4.9 (65)	3.3 (30)	3.2 (30)	PE(M2)	5.1 (17)	4.7 (30)	3.0 (30)

Notes see in Table 4.

SOM 5. Variability of condylar articulate surface

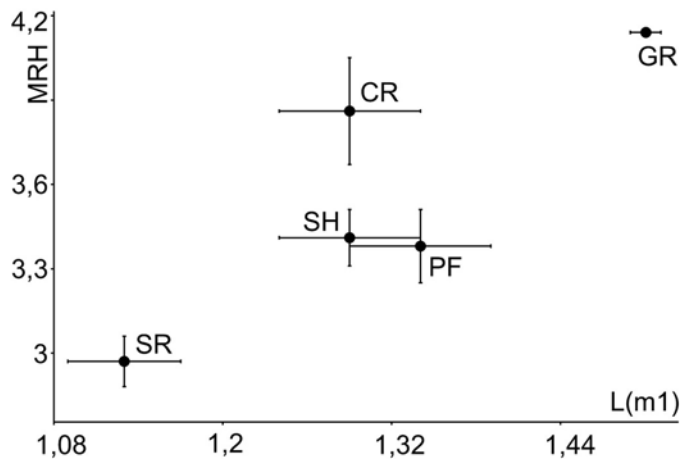


**Fig. 1.** Shape of condylar surface of *Shargainosorex angustirostris* gen. et sp. nov. A. Left condyle, ZISP#104325/1008. B. Left condyle, ZISP#104325/1088. C. Left condyle, ZISP#104325/1192. D. Right condyle, ZISP#104325/1195. E. Left condyle, ZISP#104325/1182. F. Left condyle, ZISP#104325/1199. Scale bar = 1 mm.



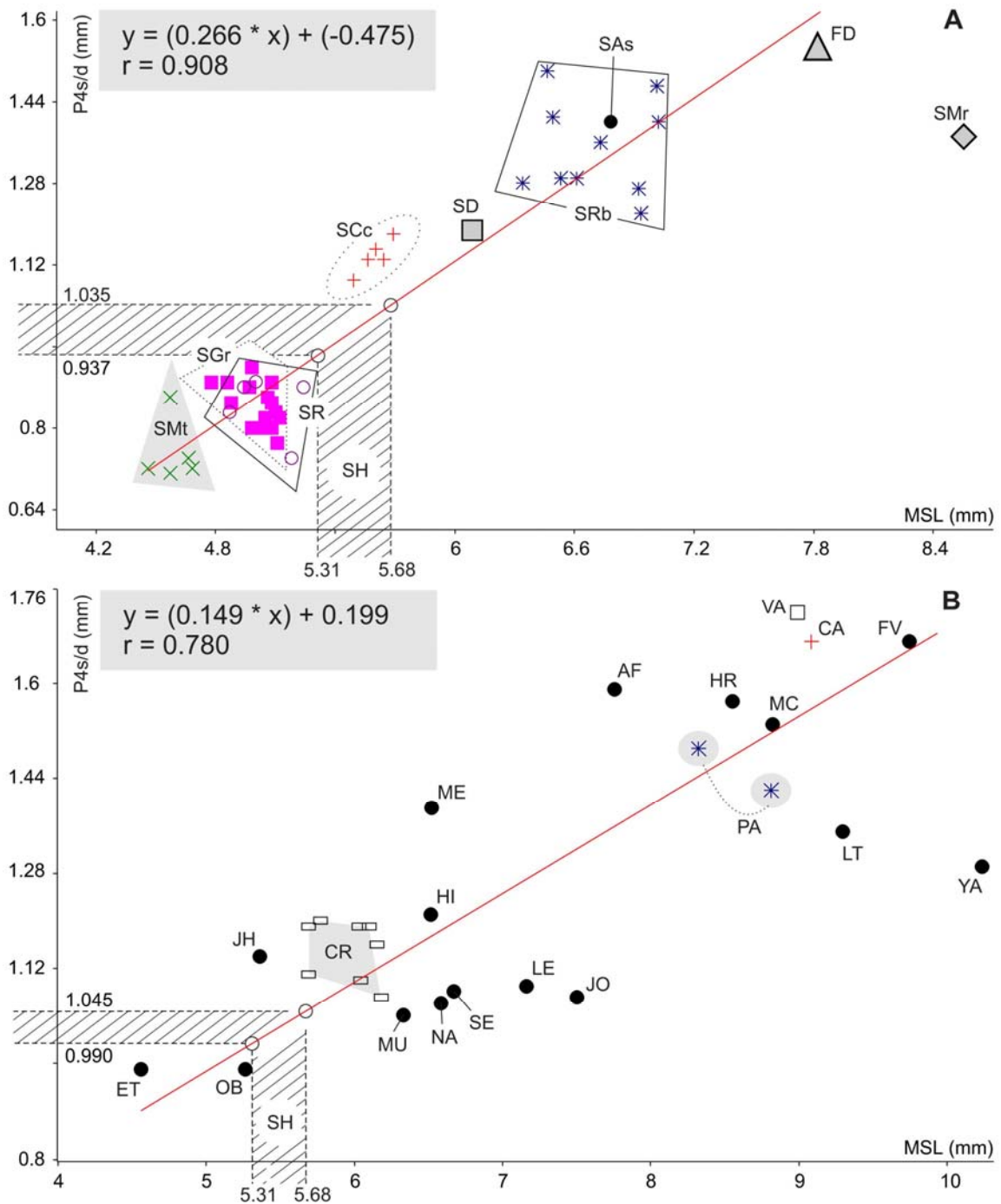
**Fig. 2.** Shape and variability of condylar surface of several white-toothed shrews. A. *Crocidura afeworkbekelei* Lavrenchenko et al., 2016: ZMMU#162697 (A<sub>1</sub>), #162643 (A<sub>2</sub>), #162644 (A<sub>3</sub>). B. *C. glassi* Heim de Balsac, 1966: ZMMU#164853 (B<sub>1</sub>), #164856 (B<sub>2</sub>), #164860 (B<sub>3</sub>). C. *C. baileyi* Osgood, 1936, ZMMU#172690. D. *C. lucina* Dippenaar, 1980, ZMMU#189286. E. *C. macmillani* Dollman, 1915, ZMMU#166029 (E<sub>1</sub>), #166031 (E<sub>2</sub>). Scale bar = 1 mm.

SOM 6. Rostrum shape reconstruction and skull size



**Fig. 1.** Results of univariate metric comparisons between *Shargainosorex angustirostris* gen. et sp. nov. (SH), *Miosorex pusilliformis* (PF), *Miosorex grivensis* (GR), *Crocidura shantungensis* Miller, 1901 (CR), and *Sorex minutus* L., 1766 (SR). Abbreviations: min-max = limits; SD (intervals in B) = standard deviation; m = mean. Values in mm.





**Fig. 2** Results of Linear regression analysis (method RMA) of two features (MSL vs P4s/d) for nine soricine species (A) and 18 crocidurinae species (B). Both plots contained hatched areas of *Shargainosorex angustirostris* gen. et sp. nov. (SH) — MSL ranged between 5.31–5.68 mm, P4s/d reconstructed according to regression line. Species abbreviations: FD = *Neomys fodiens*; SAs = *Sorex asper*; SCc = *S. caecutiens*; SD = *S. daphaenodon*; SGr = *S. gracillimus*; SMr = *S. mirabilis*; SMt = *S. minutissimus*; SR = *S. minutus*; SRf = *S. roboratus*; AF = *Crocidura afeworkbekelei*; CA = *Myosorex cafer*; CR = *C. shantungensis*; ET = *Suncus etruscus*; FL = *C. flavescens*; HI = *C. hildegardeae*; HR = *C. hirta*; JH = *Sylvisorex johnstoni*; JO = *C. juvenetae*; LE = *C. leucodon*; LT = *C. lamottei*; MC = *C. macmillani*; ME = *Sylvisorex megalura*; MU = *C. muricauda*; OB = *C. obscurior*; PA = *Paracrocidura schoutedeni*; SE = *C. serezhkyensis*; YA = *C. yaldeni*.